PeerScout: Diversifying peer review with data and machine learning

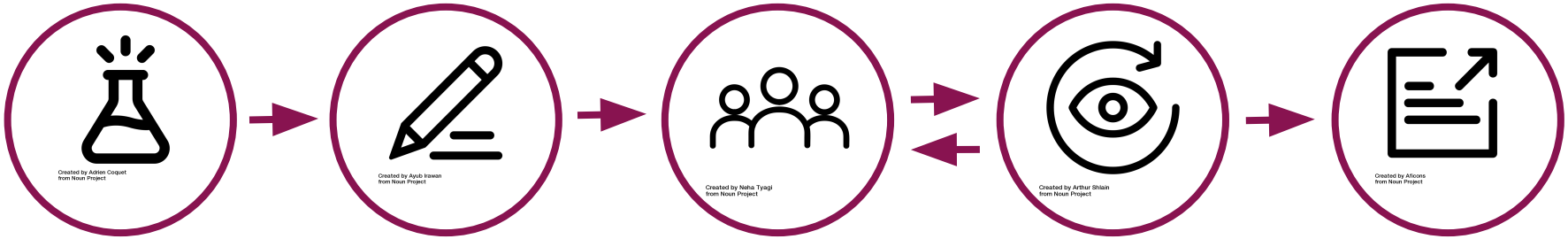
Daniel Ecer, Data Scientist, eLife
Emmy Tsang, Innovation Community Manager, eLife

csv,conf,v5

hhmi Howard Hughes Medical Institute
wellcome
MAX-PLANCK-GESELLSCHAFT
Knut and Alice Wallenberg Foundation


Helping scientists accelerate discovery by
operating a platform for research communication
that encourages and recognises the most
responsible behaviours in science.

The science publishing process



Research

Write & Submit

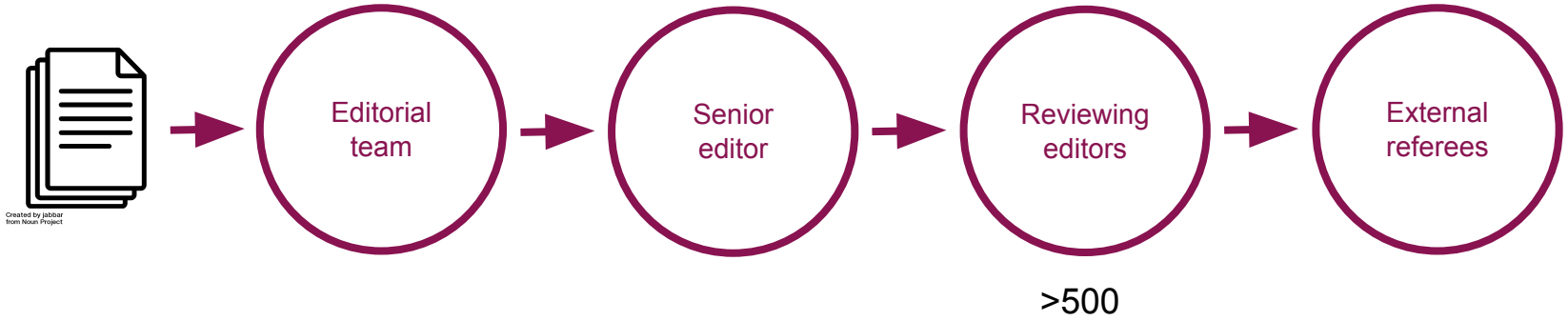
Peer review

Revision

Publish

eLife

Finding the right editors and referees for a manuscript



eLife

“We found a homophilic interaction between the demographics of the gatekeepers and authors in determining the outcome of peer review; that is, gatekeepers favor manuscripts from authors of the same gender and from the same country.”

– Murray et al., 2019

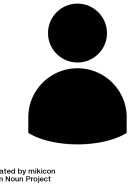
Murray, D., Siler, K., Lariviére, V., Chan, W. M., Collings, A. M., Raymond, J., & Sugimoto, C. R. (2019). Gender and international diversity improves equity in peer review. *BioRxiv*, 400515.

Also see Early-career Reviewers: Reflections on focused inclusion in reviews at eLife

eLife

PeerScout v1: Workflow

Topic modelling



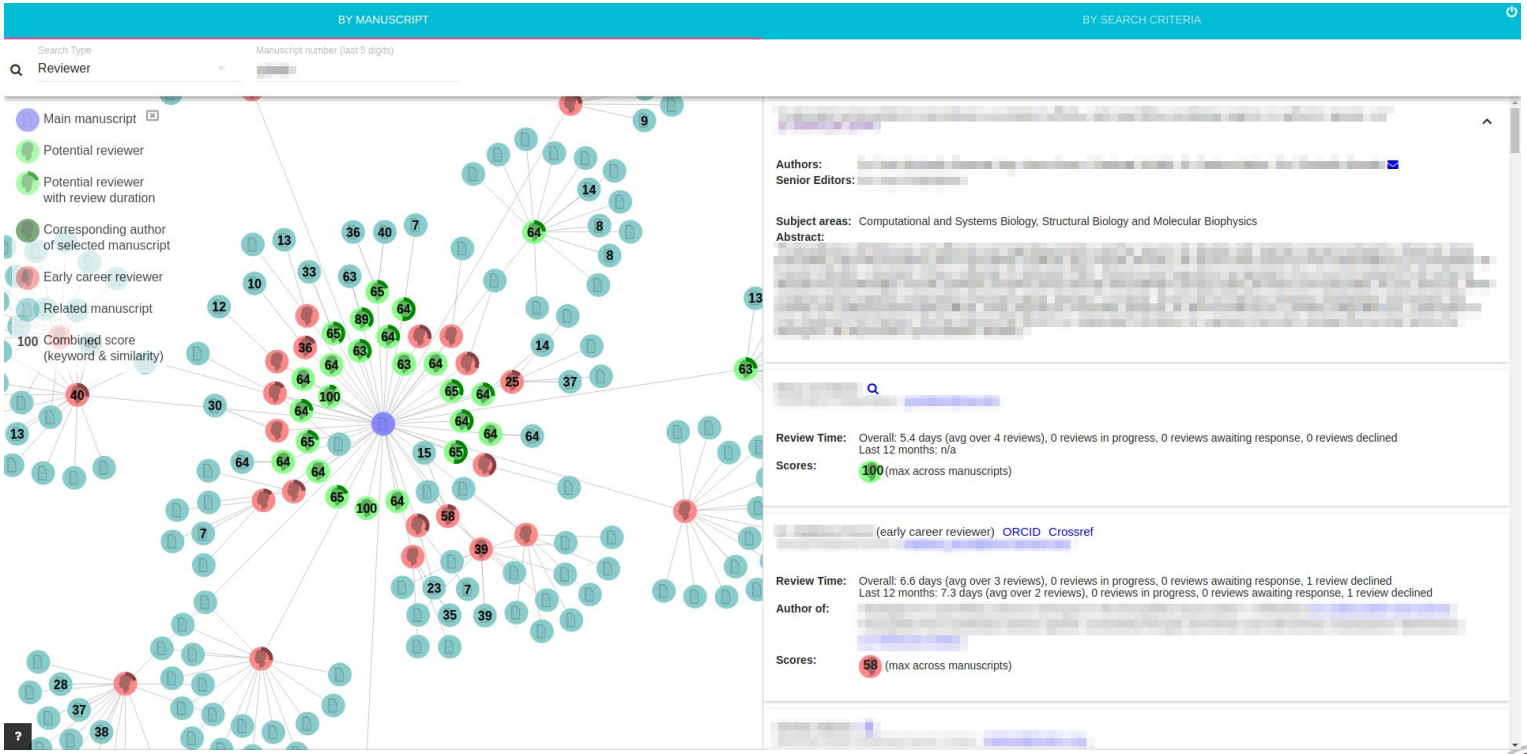
Build profile based on papers handled

Calculate score based on how much these profiles match

Ranked list for users to choose from

eLife

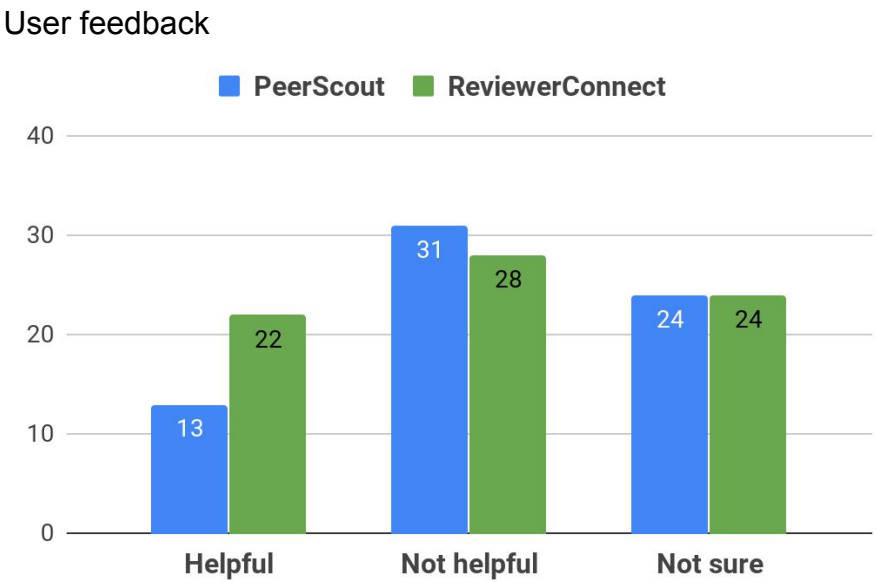
PeerScout v1: Overview



PeerScout v1: Suggested reviewers

eLife

PeerScout v1: User feedback



“I don’t know / have never heard of this person.”

“Wrong area of expertise.”

eLife

Lessons learnt from PeerScout v1

We were trying to kill too many birds with one stone: getting editors to use and trust this new AI tool, adding early career researchers (ECRs) to the reviewing process

With v2, we need to:

- Find a way to benchmark the performance of PeerScout, on a technical level
- Improve UI and information displayed to gain editors' trust
- Add ECR information and recommendations into the tool but in a way that does not interfere with the above two goals

PeerScout v2: Workflow

Keyword / Keyphrase Extraction

Build profile based on papers handled

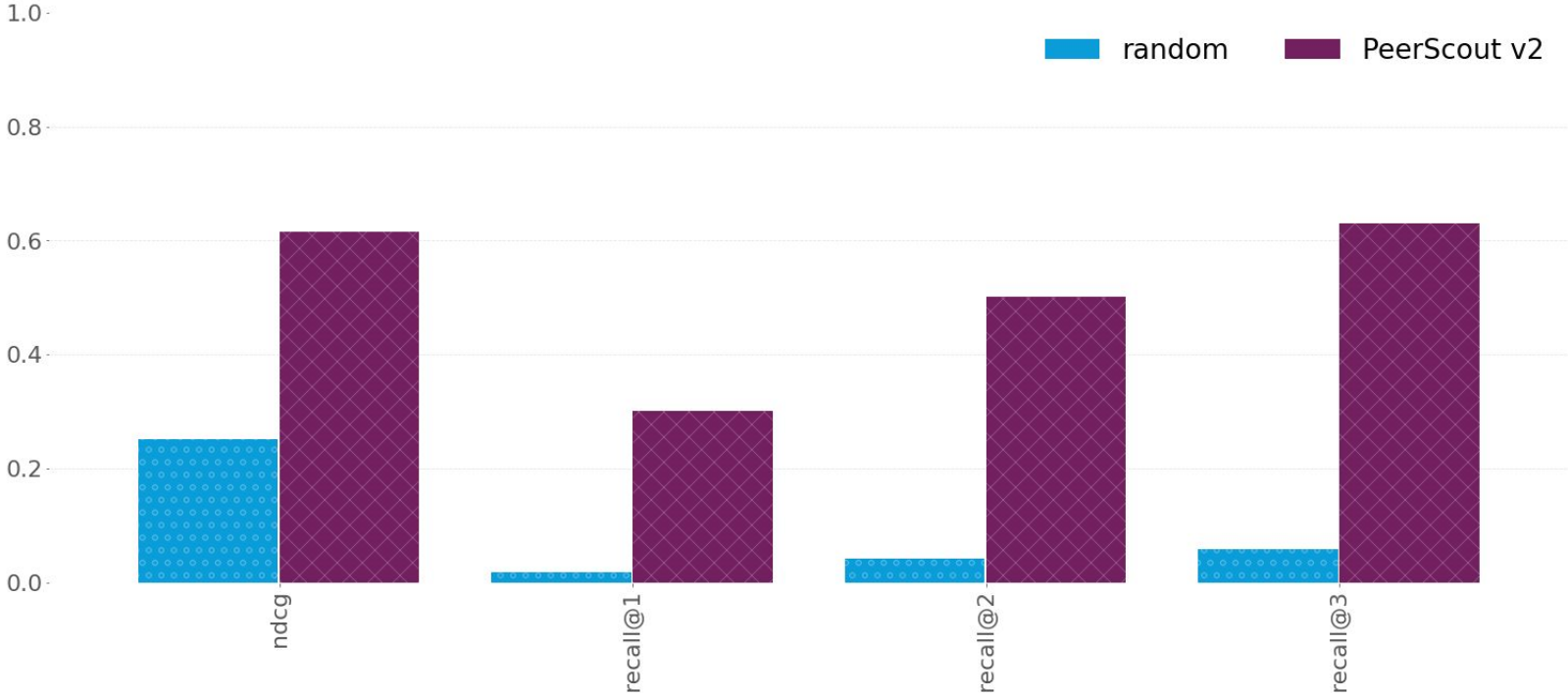
Calculate score based on how much these profiles match

Ranked list for users to choose from,

Most relevant keywords / keyphrases

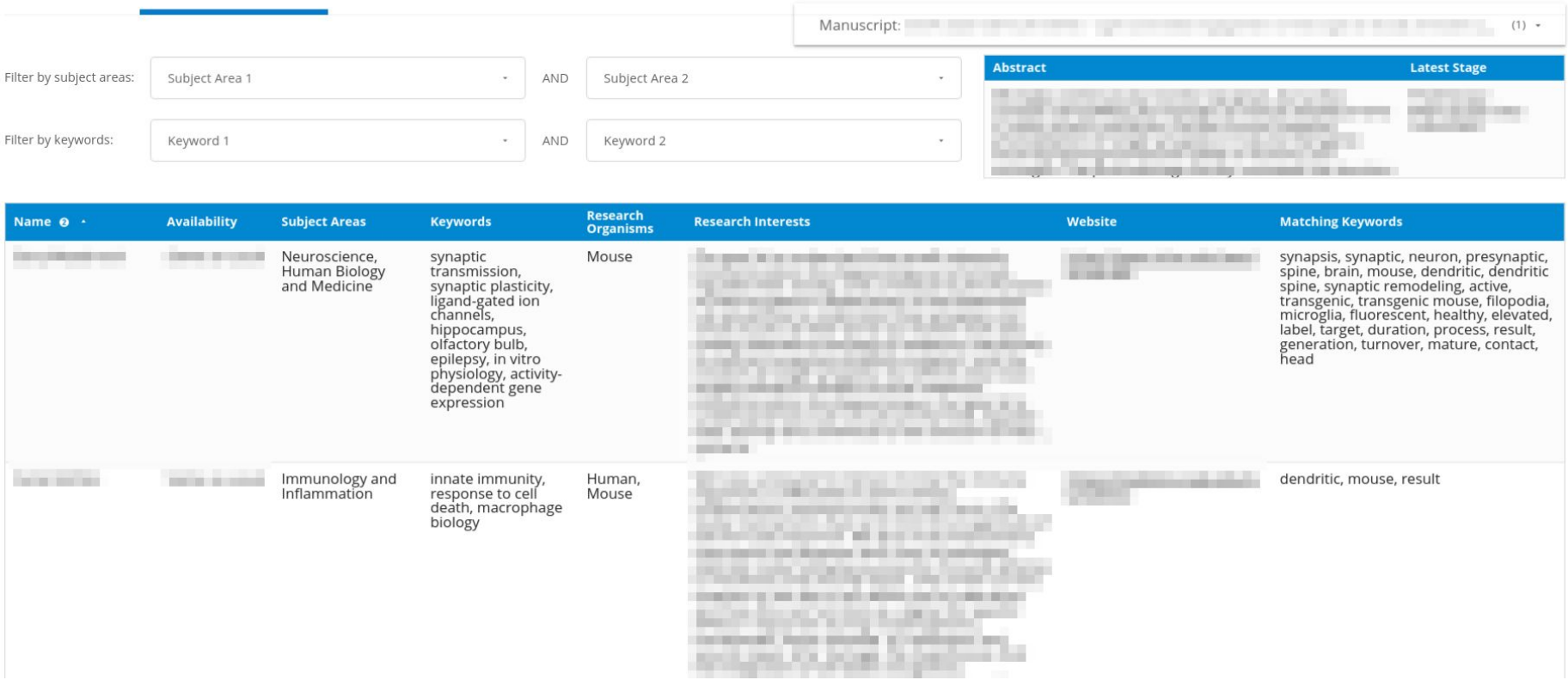
eLife

PeerScout v2: Evaluation



eLife

PeerScout v2: User interface

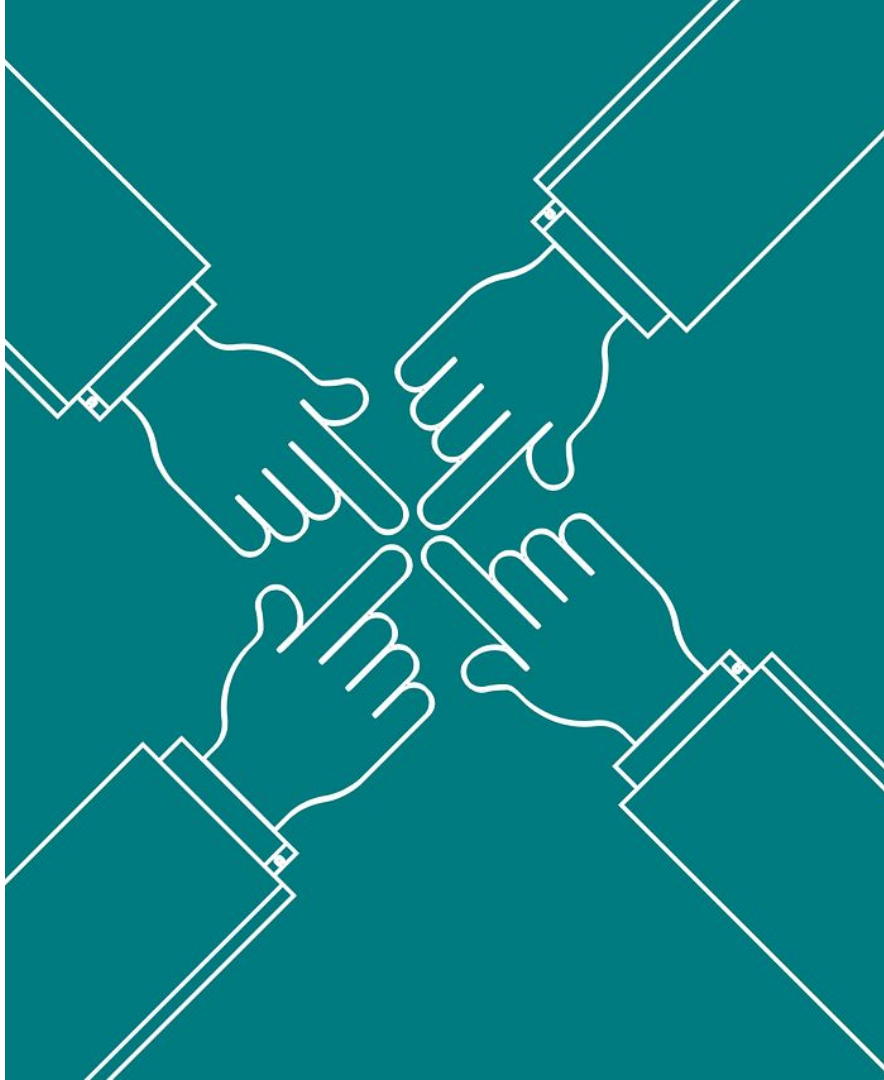


What we have learnt

- AI/machine learning/big data solutions serve little value if they are not designed to meet user needs
- Working closely with users (our editorial community) allows us to respond and make changes to address their concerns – their support is crucial in this process
- Tackle problems one-by-one to better prioritise and measure performance

In the future

- Explore concept extraction from papers
- Expand recommendations to not only past reviewers and ECR lists, but the wider scientific community
- Explore alternative data sources to build profiles, e.g. authored papers
- Turn this around: editors to see a list of recommended papers that they can potentially handle?



Thank you!

Daniel Ecer
Data Scientist, eLife

Emmy Tsang
Innovation Community Manager, eLIfe
innovation@elifesciences.org
t @eLifeInnovation / @emmy_ft

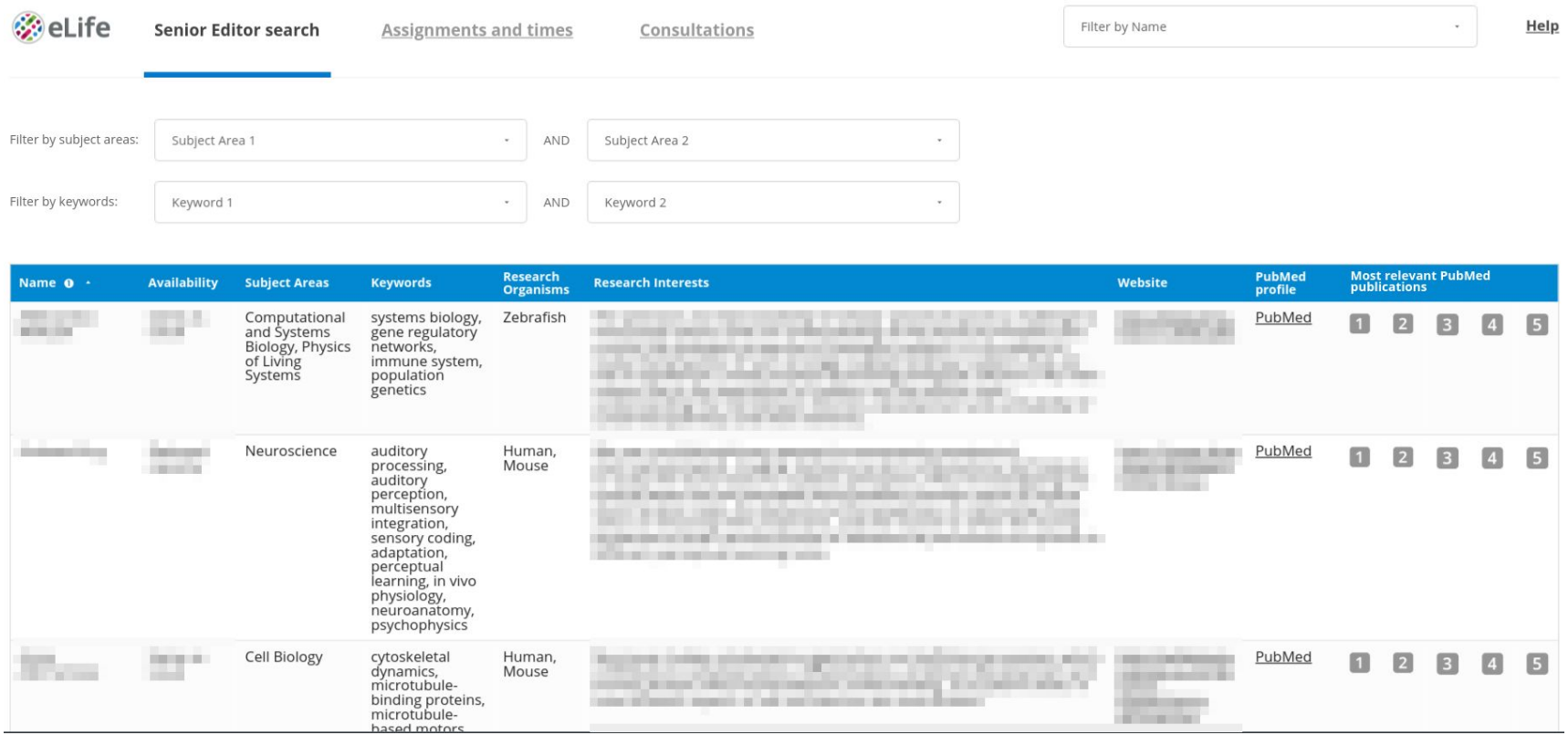
Sprint 2020: elifesci.org/sprint-2020

Stay updated: elifesci.org/tech-news

Labs: elifesci.org/labs

Supplementary information

Editor Search



ECR Reviewer Search